



UNITED STATES PATENT AND TRADEMARK OFFICE

52
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. | |
|------------------------------|-------------|----------------------|--------------------------|------------------|--|
| 10/084,254 | 02/27/2002 | Douglas G. MacMartin | 67,008-039/S-5448/S-5450 | 2012 | |
| 26096 | 7590 | 03/07/2005 | EXAMINER | | |
| CARLSON, GASKEY & OLDS, P.C. | | | | PHAM, THOMAS K | |
| 400 WEST MAPLE ROAD | | | | ART UNIT | |
| SUITE 350 | | | | PAPER NUMBER | |
| BIRMINGHAM, MI 48009 | | | | 2121 | |

DATE MAILED: 03/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|------------------------------|------------------------|---------------------|--|
| | 10/084,254 | MACMARTIN ET AL. | |
| | Examiner | Art Unit | |
| | Thomas K Pham | 2121 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

Disposition of Claims

4) Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-3,5-13 and 15-20 is/are rejected.

7) Claim(s) 4 and 14 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 27 February 2002 is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/16/05.
4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
5) Notice of Informal Patent Application (PTO-152)
6) Other: ____.

Response to Amendment

1. This action is in response to the request for re-consideration filed on 12/21/2004.
2. New claims 11-20 filed by applicants have been added.
3. Applicant's arguments with respect to claims 1-3 and 5-10 have been considered but are moot in view of the new ground(s) of rejection.

Quotations of U.S. Code Title 35

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Information Disclosure Statement

8. The information disclosure statement filed 2/16/2005 has not been considered by the Examiner since the listed U.S. Applications contained either a U.S. Application Publication or Patent Numbers. Examiner has re-listed on PTO-892 the corresponding U.S. Application Publication and Patent Number. The IDS includes some documents with wrong serial numbers which can not be determined, therefore, will not be considered.

Claim Rejections - 35 USC § 103

9. Claims 1-3, 5-10, 11-13 and 5-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,526,292 ("Hodson") in view of "Flight test of Active Gear-Mesh Noise Control on the S-76 Aircraft" by ("Millott") and further in view of U.S. Patent No. 5,834,918 ("Taylor").

Regarding claims 1, 6, 11 and 16

Hodgson teaches reducing sensed physical variables (abstract, "active noise and vibration") including: generating a plurality of control commands as a function of the sensed physical variables (abstract, "broadband disturbance signal detector" for providing signal representation of frequency spectrum as shown in fig. 2 reference signals 11); generating an estimate of a relationship between the sensed physical variables and the control commands, wherein the estimate is used in generating the plurality of control commands (col. 6 lines 25-48, "FIG. 11 is a block diagram ... the digital output device" [relationship between actuator means and sensor means]). Hodgson does not teach updating the estimate of the relationship based upon a response by the sensed physical variables to the control commands, wherein the control command

includes a normalization factor on the convergence rate that depends on the estimate, and wherein said normalization factor is updated based on the update to the estimate. However, Millott teaches generating control signals based on an estimate of the plant transfer function and updating the estimated relationship based upon the sensed physical variables (see algorithm approach of Figure 4 and “Control Algorithm” section where Millott also discloses $\Delta z = T \Delta u$) for the purpose of reducing the noise level in the active noise controlling process. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the process of Millott with the system of Hodgson because it would provide for the purpose of reducing the noise level in the active noise controlling process. Furthermore, Taylor teaches the control command includes a normalization factor on the convergence rate that depends on the estimate, and wherein said normalization factor is updated based on the update to the estimate (col. 13 lines 12-47, “Using a robust normalized gradient update … used for improved robustness” and claim 18) for the purpose of obtaining self-tuning control using the updated simplified mathematical model (see col. 3 lines 23-29). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Taylor with the system of Hodgson because it would provide for the purpose of obtaining self-tuning control using the updated simplified mathematical model. *Examiner interprets the QR decomposition of claims 6 and 16 can be represent by a positive normalization factor of Taylor as described in the current application (see page 3 lines 2-8).*

Regarding claims 2 and 12

Hudgson, Millot and Taylor do not teach determining a Cholesky decomposition; and reducing the computations per iteration by splitting the Cholesky decomposition over more than one of

said iterations. However, determining a Cholesky decomposition in an active noise and vibration control is well known and expected in the art. U.S. Patent No. 6,487,524 by Preuss teaches using Cholesky procedure as a well-known to be numerically stable (see col. 1 lines 30-33). Furthermore, reducing the computations are also part of any algorithm development goal.

Regarding claims 3 and 13

Millot teaches generating a matrix of sensed physical variable data ($z_{\text{sub},k}$); and generating a matrix of control command data ($u_{\text{sub},k}$), wherein $\Delta z_{\text{sub},k} = T \Delta u_{\text{sub},k}$, and where T is a matrix representing said estimate (see section “Control Algorithm” of Millot).

Regarding claims 5 and 15

Millot teaches updating a normalization factor on a convergence rate of the function (see Millot “Control Algorithm” and rejection of claim 1).

Regarding claims 7 and 17

Millot teaches include adaptive quasi-steady control logic as a function of $\Delta u_{\text{sub},n} = (T_{\text{sub},n}^* T_{\text{sub},n} + W)^{-1} T_{\text{sub},n}^* y_{\text{sub},n}$ (see section “Control Algorithm” of Millot).

Regarding claims 8 and 18

Millot teaches reformulating the adaptive quasi-steady control logic into the QR decomposition (see section “Control Algorithm” of Millot).

Regarding claims 9 and 19

Millot teaches the adaptive quasi-steady control logic uses a square root algorithm in which theoretically negative feedback gains are computed as negative feedback gains (see section “Control Algorithm” of Millot).

Regarding claims 10 and 20

Art Unit: 2121

Millot teaches propagating an estimate of a physical variable $Y_{sub.n}$ as a function of $Y_{sub.n} = (W + T_{sub.n} \sup{TT_{sub.n}}) \sup{-1}$ (see section "Control Algorithm" of Millot).

Allowable Subject Matter

10. Claims 4 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner *Thomas Pham*; whose telephone number is (571) 272-3689, Monday - Thursday from 6:30 AM - 5:00 PM EST or contact Supervisor *Mr. Anthony Knight* at (571) 272-3687.

Any response to this office action should be mailed to: **Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450**. Responses may also be faxed to the **official fax number (703) 872- 9306**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas Pham
Patent Examiner

TP


Anthony Knight
Supervisory Patent Examiner
Group 3600